

## Impacts of an IS on Productivity and Job Satisfaction – Healthcare and Retail

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### Abstract

The information systems are useful tools to get better performance to organizations and their employees. Other relevant factors to achieve a good organizational performance are having good levels of productivity, and a high level of job satisfaction - with employees that effectively are identified with a company and its goals. These aspects are very relevant to the business areas of health and retail, due to the strategic objectives defined primarily in terms of budget, quality of services assurance, and, in the case of the retail sector, due to competitiveness. Companies acquire information systems to increase their organizational performance. This study analyses the perception of impacts that an information system promotes on organizations, in terms of levels of productivity and job satisfaction, according to the perspective of employees in the Human Resources department, and managers in the areas of health and retail. A questionnaire was administered to 113 users of the application, and it was found that, after using that software for some time, they consider themselves more productive (than satisfied) at work and, in general, they recognize several benefits to justify the use of the application, especially in terms of their productivity, feeling in general satisfied. The performance improvements, the correct application of legislation, and the process optimization, contribute to improve communication and to increase the quality of life of employees. These are the main impacts recognized by users of the application, so it appears that these improvements provide greater levels of productivity and greater job satisfaction.

**Keywords:** Information systems, productivity, job satisfaction, social impact, cultural adaptation, social identity, information society.

### 1. Introduction

Several companies are waging on information systems (IS) and information technology (IT) in order to optimize their operations and achieve greater productivity. The focus in IS and IT requires a significant investment so it is important to verify if the expected benefits are achieved.

An information system is an organized combination of information, people and procedures that contribute to the achievement of organizational goals. Through the information is possible to build knowledge (e.g. Alter, 1992; Zins, 2007), promote benefits at operational level or strategic level, changes in industry structure or generate new businesses. Thus, productivity can increase with the use of information systems (e.g. Porter & Millar, 1985).

The IS and IT have assumed a prominent role in areas such as healthcare and retail. In the area of public healthcare, in 2011 became the SPMS, the organization responsible for the development, maintenance and operation of IS, IT and communication, with the mission of cooperation and sharing knowledge and information (e.g. SPMS, EPE). The investment in IS and IT in the retail area allows the optimization of operations and processes and promotes innovation, differentiating factor in this area, and has a particular relevance for allowing the support of the most complex operations, making it possible to invest on new concepts and services, allowing deal with the highly competitive and decrease the profit margins (e.g. Teles, 2008).

Being the increase of productivity one of the benefits expected with the acquisition of IS and IT, becomes important to understand this concept and its relevance. Productivity is the production efficiency relating a level of output with a given amount of input usually expressed in a ratio between outputs and inputs. The goal is to use the inputs as much as possible by increasing efficiency in its use (e.g. Cibrão, 2006; Syverson, 2011). The productivity measure is used by organizations to make strategic decisions, and influences the social returns due to acquired knowledge. Productivity explains in large part the higher incomes and better living standards of a society and can be leveraged by internal factors such as managers, quality of labour and capital, like reputation of the organizations, technologies, customer loyalty and know-how. Productivity can be analyzed by one or more factors (e.g. Syverson, 2011).

The analysis of productivity with a single factor is often based on labour, capital or materials productivity; however, this measurement is influenced by the intensity of usage of the excluded factors. To avoid these influences of excluded factors is used by various investigators the multifactor productivity that reflects the change in output produced for a fixed set of inputs subdivided into capital, labour and materials. This way of measuring productivity raises several issues but the aggregation function of the inputs most common is Cobb-Douglas to measure productivity (e.g. Syverson, 2011; Caves, Christensen & Diewert, 1982).

In this research the relevant areas are the healthcare and retail. In terms of healthcare productivity the measurement is usually based on the costs of the activity and levels of service, also considering the quality of the services, because is made a quantification of human life and its quality. Healthcare is seen as an essential good that allows each individual to have physical and mental well-being and a socially and economically productive life while getting a social well-being. In 2011 more than half of Portuguese hospitals were public and their performance is quite important to the overall competitiveness of the country. Given the scarcity of resources it has been necessary to seek productivity gains in this area (e.g. Ferreira, 2009). Some IS have been implemented to obtain, among other benefits, greater efficiency, sustainability, governance, management and monitoring in healthcare. The private sector is distinguished from the public for their profit, without focus on the providing of healthcare services equally to everyone. This sector has a strong potential cause has grown due the high quality of services, investments in high technology, rapid growth in the number of professionals and performing complex procedures (e.g. Eira, 2010). In the retail sector, productivity has also an important role to ensure the profitability face of increased competition. The cost reduction is vital to distributors, without decrease the quality of services, and, satisfaction is a very important element for success. Therefore, it is necessary to evaluate the performance of the stores, including the level of customer satisfaction. The evaluation of the performance of the stores is based on three topics, store attributes, area and customer characteristics. Productivity ratios are often used to define the space and location of the products (e.g. Barros, 2006; Castro, 2007).

Another expected benefit with the acquisition of IS and IT is to improve the level of job satisfaction. There are many definitions of job satisfaction but, generally, it refers to the feelings of individuals in relation to their job. Job satisfaction is a concept whose measurement will always be subjective and dependent on each person, being the own perception about the feels in a professional context (e.g. Green, 2000; Worrell, 2004; Pereira, 2005).

Much of the time of the active population is spent on the job, and that can be seen as a means to achieve different personal goals, growth and professional achievement. Because of that a greater association between the work and personal expectations promotes a greater satisfaction. Job dissatisfaction originates a will of changing job (e.g. Green, 2000). For Spector (1997), the 3 reasons for the importance of job satisfaction are: influence on behaviour and performance of employees, on the emotional well-being, values and health problems and the influence thereof on operational indicators. The levels of job satisfaction can be reflected directly or indirectly in personal satisfaction, physical and psychological/emotional well-being, performance, absenteeism, turnover and customer satisfaction. Job satisfaction is influenced by different personal or organizational factors (e.g. Wexley & Yukl, 1984).<sup>1</sup> Not all factors are unanimously accepted, however some researchers showed that age, gender, race, qualifications, seniority, autonomy, recognition, responsibility, tasks, respect, relevance of the tasks performed, progression/development, earnings, equity in rewards, working conditions, location of the job, interpersonal factors, relationship with supervisors, feedback obtained, work schedules and safety are factors that promote impacts on the level of job satisfaction (e.g. Green, 2000; Worrell, 2004; Cerdeira, 2010).

There are several ways to measure job satisfaction, namely interviews, items measurement, observation in the workplace and questionnaire. The questionnaire is the most used because it is easier to deploy, less susceptible to bias, ensures greater confidentiality, requires less time and money than interviews and allows us to analyze any number of facets hypothesized.<sup>2</sup>

Job satisfaction, as productivity, is also very relevant in the areas of healthcare and retail. Employees and the organization for which they work must have common interests to avoid disagreements among themselves. Job dissatisfaction can take to disagreements, most relevant in healthcare, because professionals in this area deal with the health of the population and HR are a resource to optimize, use efficiently and coordinate well. It is important to ensure a good relationship between colleagues and hierarchical levels for greater availability of staff and to reduce the impacts on health of employees, due to job dissatisfaction, because in this area there are already professional risk factors to

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<sup>1</sup> We must distinguish intrinsic factors - directly related to the work - from extrinsic factors to the work - which are not directly related to the tasks performed.

<sup>2</sup> Most frequently used measures are Minnesota Satisfaction Questionnaire (MSQ), Job Descriptive Index (JDI), Job Diagnostic Survey (JDS), Job Satisfaction Survey (JSS) and Job in General Scale (JIG) (Worrell, 2004; Spector, 1997).

employees (e.g. Cerdeira, 2010; Menezes, 2010). In the retail area the dissatisfaction of employees is common, due to factors such as temporary, monotony, overwork, relationship with colleagues and superiors, low remunerations, committees dependent of performance, shift work, disability of organizations to comply with the law especially as regards the maximum work periods, rest and compensation for extended periods of work and flexibility required without return. Thus, it exist a large investment in recruitment and training new employees. Job dissatisfaction may lead to greater voluntary and involuntary absenteeism, higher turnover and lower performance, for lack of skills development (e.g. Cruz, 2008; Peres, 2007).

In this sense, this research intends to analyze the impact of an application on increased productivity and job satisfaction in organizations in the areas of healthcare and retail. It also aims to find the factors associated to these impacts. Our main question leads us to:

Verify the perception of the participants about their productivity; Verify the perception of the participants about their job satisfaction; Verify the perception of the participants about the IS; Verify the impact of IS on job satisfaction and productivity of the participants.

Despite the productivity and job satisfaction may be related, it is important to understand how these factors are associated and vary. Thus, we intend to investigate how the use of IS promotes an increase on productivity and also on job satisfaction.

## **2. Empirical Study - Method**

The sample had 113 employees of the HR Department or managers who work with the IS (42 women and 71 men; 67 public sector and 46 private sector; 77 have management roles; age average around 43 years; professional experience average around 19 years).

We built a questionnaire based on existing scales (JSS of Spector, 1985), literature review (factors with influence on employees job satisfaction and productivity) and a focus group (with decision makers and users). This questionnaire had eight groups of closed questions following Likert scales (1 to 5).<sup>3</sup> The questionnaire was available online (25th March to 30th April 2013) with anonymous and confidential answers. Data were analyzed in terms of descriptive statistics (analysis of frequencies, means, standard deviations), principal components analysis (PCA) - to find the key dimensions associated to the productivity, job satisfaction and influence of IS on productivity and job satisfaction of participants (dependent variables), comparisons of means, analysis of variance - to verify the effect of the independent variables (age, professional experience, gender, sector and management role) considered in relation to the dimensions specified in the PCA, and correlations between the dimensions obtained.

## **3. Results**

### *3.1 Perceptions of the respondents on their productivity and job satisfaction*

Respondents consider the quality of services (M=4.45) and time spent in the tasks performance (M=4.10) as the most relevant factors for their productivity. As less important factors arise the costs to overtime work performed (M=3.12) and privileges of the employees (M=3.09). They consider the monotony of tasks (M=3.71), location (M=3.97), working hours (M=4.12) and supervision (M=4.12) less relevant factors for their job satisfaction, being on average all factors important to their satisfaction. Factors inherent to the work with which respondents are more in line are the taste for tasks (M=4.33), pride in the tasks performed (M=4.31), lack of salary increases (M=4.24) and good relationship with colleagues (M=4.20). Their strongest divergence relates to satisfaction with opportunities for salary increases (M=1.90), justice on the package of benefits (M=2.04), fair pay over the work performed (M=2.04) and progression faster compared to other places (M=2.06). People consider themselves more productive (M=4.25) than satisfied with their job (M=3.80).

We also observe that for the assessment of productivity responses vary between rating 3 and 5, including intervals 13-20 on a scale of 0 to 20. At the level of job satisfaction responses vary between rankings 2 and 5 including the ranges from 10-20 on a scale of 0 to 20. Most of the respondents (50.4%) consider themselves productive from 15 to 17, followed by 18 to 20 (37.2%), fits the rest (12.4%) on range of 13-14, on a scale of 0 to 20. Respondents consider

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<sup>3</sup> First question allows us to understand the factors that impact the respondent's opinion on their productivity; second refers to which assesses their productivity; third finds the factors that influence their job satisfaction; fourth evaluates respondent's job satisfaction in face of the different factors that influence it; fifth concerns the assessment of the respondents in view of their job satisfaction; sixth is on the impacts of IS; seventh let us know the level of maturity in the use of IS; the eighth refers to the overall assessment that the respondent makes the IS.

themselves their job satisfaction mostly (53.1%) in the range of 15-17, followed by classification in the range 13-14 with 30.9% the responses, and only 14.26% classify their job satisfaction in the range of 18-20 and 1.8% in the range of 10-12, on a scale of 0 to 20.

### 3.2 Time of application usage and overall satisfaction with the application

The statements with which respondents have a higher agreement in relation to IS are related to obtaining greater control over working times (M=4.15), achieving greater control over employees (M=4.03), reduced manual work (M=4.01), facilitating the coordination of schedules (M=3.99), decreasing errors in information processing (M=3.97), improved control over the management of attendance (M=3.96), reduced user errors (M=3.94) and providing more detailed information (M=3.94). The biggest disagreement arises regarding statements "Do not allow easy adjustment for users" (M=2.51) and "is not accessible at any time" (M=2.43). The perceptions of employees are consistent with the statements relating to the benefits obtained from using the application.

The average overall satisfaction with IS is 3.59 being in the range 13-14, on a scale of "0-Not at all satisfied" to "20-Totally satisfied". The average of operating time of the IS is 4.05, which corresponds to a period of use of 12 to 24 months. The majority of respondents (49.6%) use the application for 24 months or more, allowing the existence of autonomy, adaptation and application of knowledge. Only 8.9% of respondents use the application for less than 6 months, during which it carries out the exploration and adaptation to the application and to the new procedures. The satisfaction with the application focuses on the intervals 13-14, and 15-17 on a scale of 0 to 20, which is the classification assigned by 71.7% of respondents. Only 17.7% classify satisfaction with the application in the range of 18-20. Satisfaction is greatly reduced to 3.5% of respondents, being in the range of 0-9 on a scale of 0 to 20.

### 3.3 Factorial Analysis

A principal component analysis (PCA) transforms a set of correlated variables into a smaller number of independent variables to simplify the description of the data. We performed several PCA, one for each topic. The first aimed to obtain the most relevant factors on productivity. F1 refers to different types of costs related employees and the book value of the organization, being the last factor less relevant for the composition of component. F2 refers to the equipment used by employees, integration and value generated, in terms of income or notoriety (cf. Table 1).

**Table 1** – Relevant factors on productivity

Items	Variance Explained
F1 - Staff costs	52.050
F2 - Means and Revenues	13.459

Note: Varimax rotation, KMO= 0.806, Bartlett's test with significance 0.000.

In relation to job satisfaction, F1 refers to the relationship established with colleagues and leadership as well as the perception of respect to the same face, F2 includes the benefits and rewards of employees, the type of tasks and the supervisory evaluation, F3 incorporates aspects related to factors that are not directly associated with professional practice and insight into the degree of importance of tasks performed, F4 groups aspects related to the evolution and objectives of employees, F5 includes all the feedback received and the recognition from colleagues and the leadership and F6 is related with security at all levels (cf. Table 2).

**Table 2** – Relevant factors on job satisfaction

Items	Variance Explained
F1 - Interpersonal relationships	36.110
F2 - Benefits and conditions	10.560
F3 - Accessibility and importance of tasks	8.751
F4 - Autonomy, responsibility and development	6.786
F5 - Gratitude	6.627
F6 - Security	5.094

Note: Varimax rotation, KMO= 0.695, Bartlett's test with significance 0.000.

Considering the job satisfaction level, F1 respects to satisfaction with the benefits obtained and chances of progression,

internally and in face of competition, F2 join aspects related to the evaluation of the relationship with the leadership, in F3 factor enhance the task type and the number of tasks assigned face to availability<sup>4</sup>, F4 refers to the difficulties due to the existing processes, F5 reveals bureaucracies, level of clarity of tasks and liking for remaining employees, F6 shows aspects related to communication from strategic aspect to the more operational, F7 regards the appreciation and valuing of the work, F8 demotes situations of justice and safety, F9 is the overall satisfaction with the work done, and F10 includes aspects such as the evaluation of equality in work capacity as well as in obtaining wage improvements (cf. Table 3).

**Table 3 – Job satisfaction level**

Items	Variance Explained
F1 - Benefits and progression	21.389
F2 - Supervisory relationship	12.774
F3 - Tasks and competitiveness	9.585
F4 - Processes difficulty	8.760
F5 - Lack of clarity and bureaucracy	6.365
F6 - Deficient organizational communication	5.069
F7 - Lack of gratitude	4.374
F8 - Security and justice	4.078
F9 - Taste for tasks	3.556
F10 - Lack of salary increases and equality	3.033

Note: Varimax rotation, KMO= 0.695, Bartlett's test with significance 0.000.

We also studied the influence of the IS in aspects related with job satisfaction and productivity. According to the PCA results we verify that: F1 refers to improve organizational processes, F2 gather aspects related to improvements in communication and increased quality of life, F3 refers to advances in employee performance and therefore organizational performance, F4 relates to improvements in the applicability of labour law and the level of complexity of the application, F5 includes employee control and times of work performed compared to the predicted, F6 refers to the level of completeness of the system and the information available there, F7 regards the time required to perform the operations in the application and the availability of same, F8 brings together ease of use of the application and allowed the same for interconnection with other systems and F9 concerns the rigidity of application compared to any requested specific adaptation and management of overtime (cf. Table 4).

**Table 4 – Influence of IS in aspects related with job satisfaction and productivity**

Items	Variance Explained
F1 - Processes	33.953
F2 - Communication and quality of life	9.263
F3 - Performance	6.206
F4 - Complexity and legality	5.872
F5 - Control	5.309
F6 - Completeness	4.262
F7 - Application performance	3.894
F8 - Usability and integration	3.536
F9 - Flexibility and costs	3.100

Note: Varimax rotation, KMO= 0.698, Bartlett's test with significance 0.000.

### 3.4 Analysis of variance

To check the effect of age, professional experience, management positions and sector on the dimensions considered, some analysis of variance were performed (ANOVA).

<sup>4</sup>It also contains an element of competitiveness by comparing the benefits obtained and the relationship with other colleagues.

### 3.5 *Age and professional experience influence*

There is no significant effect of age or professional experience on the relevant productivity or job satisfaction. With increasing age, we observe a minor relevance to the security for job satisfaction (despite being between 6 and 15 years that the degree of importance assigned is lower). Employees with more than 49 years old, and between 6 to 15 years of experience, are those who give the least importance to the security level of job satisfaction, while who attach more importance are the participants with less than 30 or more than 49 years old, and less than 6 years of experience. The lower the age, the stronger is the perception that the application contributes to a good performance. Participants over 30 years old evaluate the help of IS in compliance with labour law and its complexity, and also consider the IS more complete, than the others. The more professional experience they have more the IS is seen as complete. The idea of control made possible by the IS is higher for employees under 30 years old and decreased with advancing age.

Employees who better evaluate their level of productivity are those with professional experience between 6 and 15 years. Employees who find themselves less productive have less than 6 years of professional experience, and are aged under 30 years.

### 3.6 *Leading role and sector influence*

Personnel costs are presented as the most important factor to the productivity for managers. Managers in public sector – in opposition to the private sector – are those who give more importance to staff costs as a productivity factor. The means and revenues as a relevant factor for productivity are very important, in particular, to private employees. The link type and position of leadership did not influence the evaluation of job satisfaction. Managers denote more satisfaction for kind of tasks, level of competitiveness and tasks they perform than employees. Employees in the private sector are those who feel less satisfied with the increases and inequality.

Supervisors in the private sector seem to be more satisfied with their supervision, than in the public sector. On the contrary, the level of satisfaction with the tasks and competitiveness are greater to the managers with public link, than to those with private link. The difficulties in the processes are most felt by employees who do not have private management positions and the more satisfied at this level are the public employees without management positions. Managers reveal a perception of great completeness and control provided by the IS, however, they don't agree with its usability and ease of integration. Private employees enhance the performance improvement provided by the IS and its better usability and integration. Public managers are those who easily consider that the IS has a good performance, but, public employees without management position are those that less agree with a good application performance. In general, employees with public link show higher job satisfaction than those in the private sector.

### 3.7 *Correlations*

The correlation analyzes aimed to identify significant associations between different dimensions defined and evaluation of respondents related to productivity, job satisfaction, time use of IS and satisfaction with it. In sum:

There is a positive correlation between the level of job satisfaction and productivity assessment, and between them and the overall satisfaction with the application. The importance attached to income increases with increasing duration of use of the IS and overall satisfaction (with the same). Employees who feel more satisfied at work give more importance to interpersonal relationships. The higher the level of overall satisfaction with the application, lowest is the employee satisfaction with the relationship with the supervisor, tasks and competitiveness, and organizational communication. Greater job satisfaction is related to greater satisfaction with the benefits and the possibility of progression, greater satisfaction with the relationship with the supervision, greater taste for the tasks, lesser difficulty in the processes, greater clarity and lesser bureaucracy, better organizational communication and gratitude. Employees who better assess their level of productivity are more satisfied with the relationship with the supervision, considering a less significant loss of organizational communication. For employees who consider themselves more productive, the application has higher completeness. The level of job satisfaction is associated with greater agreement regarding process improvements, communication and quality of life provided by the application. Greater overall satisfaction with the IS is correlated with the perception that it promotes improvement in processes, better communication, better quality of life, improved levels of performance and compliance with its lower complexity, good usability, integration and completeness. Satisfaction with IS decreases when considering that its performance is lower and it requires a strong effort to adapt to it.

#### 4. Discussion

We verify that age and professional experience have influence over the opinions about the IS, affecting the perceptions of the participants in what concerns to the aid that the application provides. These results follow, in a certain sense, those obtained in another study (e.g. Pinto, 2009), verifying that employees over age and with a great professional experience tend to have a higher resistance to the IS and less recognition of the benefits obtained through the same. The exception obtained from this study concerns the effect of work experience on the notion of completeness of the application, which increases with increasing professional experience.

In general, the managers with private are those who seem to be more satisfied, especially in terms of the relationship with the supervision, clarity and bureaucracy increases, and equality. Public managers are more satisfied with tasks and competitiveness. We also found some differences in the level of satisfaction among managers with public link, which have given the private link, contrary to what was found in the study of Maia (2012) in which no significant differences were identified. The greatest satisfaction of private employees may be associated with restructuring activities in the healthcare sector which predominantly affected public employees. High levels of job satisfaction are related to strong satisfaction with the benefits and the possibility of progression, the relationship with the supervision, a greater taste for the tasks, lesser difficulty in the processes, greater clarity and reduced bureaucracy, organizational communication and gratitude. Other studies also identified the relevance of these factors in employees's satisfaction (e.g. Carvalho & Lopes, 2006; Pereira, 2005).

Thus, this IS provides increased productivity and job satisfaction. According to the participants, the improvements provided by the IS promote job satisfaction. The application endorses a better performance, guarantees proper enforcement processes and provides productivity gains.

The relationship with the supervision, the taste for tasks, processes, clarity and bureaucracy, are aspects that significantly contribute to the overall level of job satisfaction. It was also found that the process improvements, a good communication and quality of life are the most important factors to explain the overall satisfaction with the IS. The productivity and job satisfaction are relevant in terms of human resources and supervisors. In fact, these elements are responsible for managing the Human Capital of organizations, and organizational performance may improve if teams are well managed and feel satisfied with their work, and this process starts from the example of their 'managers'.

#### 5. Conclusions

Currently, mainly due to the difficult economic and social situation, companies must try to ensure good sizing and performance over the positions and goals they want to achieve. In this sense, and because in recent years many organizations decided to invest in information systems, it becomes very important to ensure that investments are promoting a proper return.

This study was intended to validate two hypotheses concerning the use of a IS, verifying if promotes increased productivity and job satisfaction in the areas of Healthcare and Retail. The results obtained showed that, in general, employees represent themselves as more productive than satisfied with their work. Their overall satisfaction with the application in question is also positive and, unlike an existing idea in face of the focus group preliminary conducted, both the old and the professional experience, the type of contractual relationship and leading position, they have no influence on satisfaction with the application. Despite the improvements identified in control through the application, we found that the process improvements, communication and quality of life are the dimensions that best explain the overall satisfaction with the application.

The participants/employees understand the need to optimize processes, organizational communication, and simultaneously, the quality of life that promotes higher levels of job satisfaction, which in presented by several authors (e.g. Spector, 1997; Hackman & Oldman, 1975). This, in fact, are factors that influence the productivity and quality of service, promoting greater organizational success, so, it is essential to ensure that organizations get the maximum benefits possible with the resources available. Some studies conducted on satisfaction of IS users in healthcare usually conclude that IS users, in this area, have a positive level of satisfaction with the systems, despite the aspects that have to be improved (e.g. Esteves, 2007; Campos, 2012). The IS promotes process improvement, optimization of resources, and increased effectiveness and efficiency (e.g. Lameirão; 2007 Pinto, 2009).

So, we consider that the use of IS is valuable for organizations.<sup>5</sup> In the future, it would be interesting to make an identification of the benefits, and if possible, their measurement, in order to ascertain whether the benefits justify the

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5 Regarding Retail studies relate more to job satisfaction and productivity rather than analyzing the impact caused by IS.

investment.

Since information systems may assume significant relevance for organizations, first, due to their weight in the budget and, secondly, due to its contribution to the fulfilment of strategic and operational objectives, it should address the impacts promoted by the same. However, one should not overlook the impact of these systems on Human Resources of the organizations, especially if it fit on services.

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